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The Vertical Transmission in the Covid-19 Pandemic. Are Neonates at Risk? A Case Report in Iran

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Abstract

Introduction: Although there was no evidence of vertical transmission at the beginning of the pandemic, this hypothesis has been strengthened over time and there is evidence to support it. In the present article, we present a case of Covid-19 in a newborn from a mother with a recent Covid-19 infection.

Case presentation: The female neonate was born from Normal Vaginal Delivery (N.V.D) in a primiparous 30-year-old woman. Her mother was presented at 36 weeks and complained of fever and cough symptoms. The mother was admitted in Taleghani hospital with labor pain without clinical signs of Covid-19 when she had 39 weeks of G.A. All stages of labor progressed normally based on Friedman Curve and a female neonate with meconium-stained was born. The neonate Apgar score dropped gradually and central cyanosis and tachycardia appeared about 20 minutes after birth. Immediately, laboratory tests, cardiac counseling, and transformation to the Neonatal Intensive Care Unit (NICU) NICU were done. Both moderate to severe Tricuspid Regurgitation (T.R) and positive Reverse Transcription Polymerase Chain Reaction (RT-PCR) Covid-19 were reported. A set of antibiotic, antiviral, and blood product replacement treatments was prescribed based on clinical signs and laboratory results. On the 28 th day of the birth, the neonate was discharged in good general condition, while his RT-PCR Covid-19 result was negative.

Conclusion: The vertical transmission of Covid-19 in neonates is possible. Therefore, the health care providers should consider the important points in caring for these neonates.

Key Words: Covid-19, Pregnancy outcome, Vertical transmission.

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1- INTRODUCTION

Today, Covid-19 is considered a strong threat to public health in most parts of the world (1). Daily, new infections are reported and many people die due to serious conditions (2).

According to the latest statistics published by the World Health Organization (WHO), so far, 119,669,316 confirmed cases of RT-PCR have been reported and 2,652,944 cases of death have occurred because of Covid-19 pandemic. Also, 1,731,558 Iranian cases have been infected and 61,069 cases have died (3).

The whole world is trying to get a safe and secure cure and a vaccine against Covid-19 (4). Although there have been cases of success, there are no definitive results and efforts are ongoing (5).

Although people with disabilities are more likely to be injured after developing Covid-19 (6), healthy people are not excluded from post-infection complications. According to a study, even in those who survive after Covid-19, some disabilities have been reported (7). Although some groups have been identified as high-risk groups, the experience of infection in the world indicates the risk in all age groups. In fact, Covid-19 is a big danger in most parts of the world and all age groups (8). Specifically, pregnant women are considered as a high-risk group in Covid-19 pandemic because of their physiological changes in pregnancy, including changes in the immune system (9). Studies have reported different, somehow contradictory results in this regard. While a study reported similar characteristics of Covid-19 in pregnant women and non-pregnant women (9), another study reported higher rate of preterm delivery among pregnant women with Covid-19 in comparison to healthy women (10).

In addition, pregnant women are considered as a high-risk group in Covid-19 pandemic because of their physiological changes in pregnancy, including changes in the immune system (11).

Despite the fact that respiratory droplets are the most common method of transporting Covid-19, (12), there are conflicting opinions about the impossibility (13) or impossibility of vertical transfer (14).

2- CASE PRESENTATION

A female neonate with the Gestational Age (G.A) of 39 weeks was born by N.V.D in a primiparous 30-year-old woman in Taleghani hospital. Her mother was presented at 36 weeks and complained of fever and cough symptoms while her father had a positive Covid-19 RT-PCR a few days before the onset of the mother's symptoms.

The neonate's mother was treated as an outpatient to reduce the symptoms of fever and cough. She didn't need to receive supportive care or to be admitted to the I.C.U.; and her symptom recovered 2 weeks after the onset.

The mother was admitted in Taleghani hospital with labor pain without clinical signs of Covid- 19, when she had 39 weeks of G.A. All stages of labor progressed normally based on the Friedman Curve. There was no fetal distress at different stages of labor, and a female neonate with normal weight (3200 gr) and meconium-stained was born.

All primary care, including the airway suctioning, warming and drying the neonate, placing under the warmer, and providing oxygen, were performed immediately after the birth; however, Apgar score dropped gradually as general cyanosis and tachycardia appeared about 20 minutes after she was born. Therefore, all necessary assessments, including vital

signs were measured and the newborn was visited by a pediatrician. Based on the order of the pediatrician, laboratory tests, cardiac counseling, and transformation to the NICU were done. The results of vital signs and laboratory tests are presented in **table 1**.

Table-1: Vital signs and laboratory tests of the neonate

Variable		
Vital signs	Body temperature	39 ^{0c}
	Pulse Rate	110/ min
	Respiration Rate	26/min
Oxygen Saturation		84%
Blood glucose		137 mg/dl
Hb		18.6 mg/dl
WBC		20.7
Urea		20 mg/ dl
Cr		0. 8 mg/ dl
Na		141 mmol/l
K		4.2 mmol/l
LDH		1166
C.R.P		+ 1
Ph		5 mmol/l
Mg		1.99 mmol/l
PH		7.13 mm Hg
PCo2		47.7 mm Hg
HC03		17.1 mm Hg
RT-PCR COVID-19		Positive

2-1. Differential diagnosis, investigations, and treatment

On the second day, the neonate was ventilated in Synchronized Intermittent Mechanical Ventilation (SIMV) because of tachypnea and increased respiratory discharge. Also, an Echocardiography was performed for probability Persistent Pulmonary Hypertension of the Newborn (PPHN). The results of Echocardiography reported a moderate to severe Tricuspide Regurgitation (T.R). Based on laboratory results and neonatal symptoms, the drug treatments were considered as follows (**Table 2**).

3- OUTCOME

Although the neonate's nasopharyngeal swabs for Covid-19 were obtained in the first hour after birth, the RT-PCR Covid-19 reported as positive while the neonate was 4 days old. Although no drug has been reported to treat Covid-19, treatment with Remdesivir was done. On the 7 th day of her birth, the neonate's general condition improved and he received 5 cc of breast milk and Beraksurf 4 ml/Endotracheal/Single dose. The neonate was weaning while he received Nasal Intermittent Positive Pressure Ventilation (NIPPV) on the 12th day of her life. On the 16 th day, Amikacin was discontinued and the infant was transferred to an incubator. On her 18th day, Furosemide was discontinued and Captopril was reduced to 0.75 mg for two days. Breast Milk Feeding started when she was 20 days old. On the 28th day of her birth, she was discharged in good general condition, while her RT-PCR Covid-19 result was negative.

Table-2: The prescribed medications based on the time, cause, dose and method

Neonate age(day)	Cause	Medication	Dose/ method
1	Respiratory distress, Meconium aspiration	Beraksurf	4 ml/Endotracheal/Single dose
		D/W 10%	190 CC
		Ampicillin	16 mg / IV/TDS/ 5 days
		Amikacin	45mg/ IV/TDS
2	Tachypnea, increased discharge	Vit k	1 mg/IM
		FFP	50 cc/ Infusion
	T.R	Captopril	1.5 mg/ BD
		Milrinone	27 mg/ Infusion
		Dopamine	32mg/ min
		Furosemide	2mg/ IV/ stat
4	GIB	Metronidazol	5 mg stat then 25 mg daily
		FFP	35 CC/ Infusion
		Vit k	1 mg/IM
	RT-PCR Covid-19 positive	Redes Vir	16 mg stat then 8 mg/ 48 h/ 6 days
5		Apotel	30 mg
		FFP	32 CC/ Infusion
		Vit k	1 mg/IM
		Pack cell	35 mg
		Furosemide	3 mg/ IV/ stat
7	Lung bloody discharge	Vancomycin	48 mg/ IV/ BD
		Beraksurf	4 ml/Endotracheal/Single dose
8		FFP	32 CC/ Infusion
		Cryoprecipitate	32 CC/ Infusion

4- DISCUSSION

In the present case report, we introduced a neonate who showed signs of respiratory distress and tachypnea immediately after birth. The results of laboratory and clinical evaluations focused on Covid-19 as a cause of the neonate's complications. Although in the early months of the Covid-19 outbreak, there was no vertical transfer hypothesis (13, 15-17), the vertical transmission perspective strengthened over time and with more pregnant mothers becoming infected (17-19). A systematic review that included 83 neonates, reported positive RT-PCR Covid-19 samples of the nasopharyngeal swab in three neonates. In addition, six neonates had high levels of virus-specific antibody in serum samples collected after birth without positive RT-PCR Covid-19 (17). Another study systematically reviewed the results of 13 articles published in different locations. In this article, the data of 538 pregnant women were evaluated. The results raised the possibility of vertical transmission risk (18). An Iranian systematic review, including 21 articles, showed that 4 of 86 neonates born to mothers infected with Covid-19 had a positive RT-PCR Covid-19, which can confirm the possibility of vertical transmission (20). In this study, respiratory distress and pneumonia were reported as the most common neonatal complications (20). Confirming such results, the neonate in our report also

showed signs of respiratory distress immediately after birth.

5- CONCLUSION

The vertical transmission of Covid-19 in neonates is possible. Therefore, the health care providers should consider the important points in caring for these neonates.

6- ETHICAL CONSIDERATIONS

This study was approved by Ilam University of Medical Sciences. Ethical clearance was sought from the medical ethics committee of Ilam University of Medical Sciences, Ilam, Iran (IR.MEDILAM.REC.1399.127). Written informed consent was obtained from the patient for publication of this case report and any accompanying images.

7- COMPETING INTERESTS

The authors declare that they have no competing interests.

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